
Chapter 3: Link maintenance commands

Use the commands in this chapter to manage the links between the Application Module or IPE Module, Meridian 1, host computer, and Meridian Mail. The commands provide the following:

- Link control—enables and disables the link
- Link status—displays the status of a single link or all links
- Link configuration—displays or changes the link control or link parameters
- Link statistics—displays protocol statistics for the link
- Association services—displays information on associated Meridian Link applications, the directory numbers registered for those associations, and the resources acquired by an application for those associations. This command also specifies the type of information you wish to receive for an association (enables or disables message statistics, filters particular messages, records messages, and/or monitors particular messages on the system console). (Meridian Link only)
- Traffic report—counts messages flowing to and from an application (Meridian Link only)
- Link tracing—records all messages flowing across a link
- Link testing—continuity and loopback tests
- File viewing—displays system log, record, and trace files
- Miscellaneous services—displays help text or version information, and quits the user session

Using link maintenance commands

Link maintenance commands are available when you are logged in as mlusr and the CCR or Meridian Link application is running. To access the commands, do one of the following:

- log in as mlusr from the “Console Login:” prompt
- enter the mlusr command while logged in as maint

If the system responds unexpectedly to a request, mlusr provides troubleshooting diagnostic facilities.

Command format

The command format for each link maintenance command is illustrated in this chapter, and many are accompanied by examples. Type the commands at the “mlusr>” prompt. The following conventions apply:

- *Italics* indicate that the parameter shown should be replaced by the appropriate information. For example, *link_number* should be replaced by the actual link number.
- *[Text in square brackets]* indicates optional parameters. Three dots after the text (for example, *[message ...]*) indicate that you can type multiple instances of the parameter.
- The word, *message*, indicates that the message type or message name parameter may be used. This subject is discussed in more detail later in this chapter, under “Meridian Link messages.”

Some commands can be abbreviated, as long as the abbreviation is unique (for example, you can enter **g a** for “get associations”). If the abbreviation you type is not unique, an error message indicates that you must type in a more specific command.

Table 3
Link maintenance commands

Command	Description	Applies to
enable link <i>link#</i>	puts link in enabled state	Links 0, 1, and 2
disable link <i>link#</i>	puts link in disabled state	Links 0, 1, and 2
status link <i>link#</i>	displays status of link	Links 0, 1, and 2
get links	displays all configured links	Links 0, 1, and 2
display linkctl	displays contents of link control file	Links 0, 1, and 2
change linkctl	allows you to change entries within link control file	Links 0, 1, and 2
read linkctl <i>filename</i>	reads the contents of specified link control file into memory	Links 0, 1, and 2
save linkctl <i>filename</i>	saves link control information to file specified	Links 0, 1, and 2
display link <i>link#</i>	displays current link configuration parameters	Links 0, 1, and 2
change link <i>link#</i>	allows you to change link configuration parameters	Links 0, 1, and 2
save link <i>link#</i> [<i>filename</i>]	saves link parameters to file specified	Links 0, 1, and 2
read link <i>link#</i> [<i>filename</i>]	reconfigures a link from parameters saved in a file	Links 0, 1, and 2
statistics link <i>link#</i>	generates a protocol-specific list of statistics for link number specified	Links 0, 1, and 2
get associations	displays information on current associations (Meridian Link only)	Applications
get dn <i>association_id</i>	displays DNs registered for specified association (Meridian Link only)	Applications
get resource <i>association_id</i>	displays Meridian 1 resources acquired for specified association (Meridian Link only)	Applications
— continued —		

Table 3
Link maintenance commands (continued)

Command	Description	Applies to
enable msgstat <i>association_id</i>	turns on collection of message statistics for specified association (Meridian Link only)	Applications
disable msgstat <i>association_id</i>	turns off collection of message statistics for specified association (Meridian Link only)	Applications
clear msgstat <i>association_id</i> [<i>message</i>] [<i>message...</i>]	resets the statistics count to 0 for specified association (Meridian Link only)	Applications

<code>get msgstat association_id [message] [message...]</code>	displays current statistics for specified messages (Meridian Link only)	Applications
<code>set filter association_id message [message...]</code>	adds message types from the list of messages to be filtered (Meridian Link only)	Applications
<code>clear filter association_id message [message...]</code>	removes message types from the list of messages to be filtered (Meridian Link only)	Applications
<code>enable filter association_id</code>	turns on filtering of messages across the link (Meridian Link only)	Applications
<code>disable filter association_id</code>	turns off filtering of messages across the link (Meridian Link only)	Applications
<code>get filter association_id</code>	displays filter status of messages for the specified association (Meridian Link only)	Applications
<code>set record association_id message [message...]</code>	adds message types from the list of messages to be recorded (Meridian Link only)	Applications
<code>clear record association_id message [message...]</code>	removes message types from the list of messages to be recorded (Meridian Link only)	Applications
— continued —		

Table 3
Link maintenance commands (continued)

Command	Description	Applies to
enable record <i>association_id</i>	turns on recording of messages across the link (Meridian Link only)	Applications
disable record <i>association_id</i>	turns off recording of messages across the link (Meridian Link only)	Applications
get record <i>association_id</i>	displays recording status of messages for the specified association (Meridian Link only)	Applications
set monitor <i>association_id</i> <i>message [message...]</i>	adds message types from the list of messages to be monitored (Meridian Link only)	Applications
clear monitor <i>association_id message</i> <i>[message...]</i>	removes message types from the list of messages to be monitored (Meridian Link only)	Applications
enable monitor <i>association_id</i>	turns on monitoring of messages across the link (Meridian Link only)	Applications
disable monitor <i>association_id</i>	turns off monitoring of messages across the link (Meridian Link only)	Applications
get monitor <i>association_id</i>	displays monitor status of messages for the specified association (Meridian Link only)	Applications
enable traffic <i>association_id [period]</i> <i>[file_name] [lpr] [terminal]</i>	turns on traffic reporting for the specified association "lpr" and "terminal" are key words (Meridian Link only)	Applications
disable traffic <i>association_id</i>	turns off traffic reporting for the specified associations (Meridian Link only)	Applications
get traffic <i>association_id</i>	gets traffic information for the specified association (Meridian Link only)	Applications
— continued —		

Table 3
Link maintenance commands (continued)

Command	Description	Applies to
loopback test	allows you to connect a cable between two ports and perform a loop test For TCP/IP, execute the ping command to test the network connection between the Meridian Link Module and the host.	Links 0 and 1
continuity test	performs a continuity test on links 0 and 1	Links 0 and 1
trace link <i>link#</i> <i>[trace_level] [filename]</i>	records all messages flowing across the specified link	Links 0, 1, and 2
trace main <i>[trace_level]</i> <i>[filename]</i>	records all messages flowing through the system	Links 0, 1, and 2 and Applications
untrace link <i>link#</i>	turns off link tracing	Links 0, 1, and 2
untrace main	turns off system tracing	Links 0, 1, and 2 and Applications
view	allows you to select and display a log, trace, or record file	Files
viewlog	displays contents of the SysLog file	SysLog file
help	displays a summary of link maintenance commands	General help information
help <i>keyword</i>	depending on the keyword used, displays help text for a command or a list of Meridian Link messages	Specific help
version	displays software release version of current application	Release information
exit	ends mlusr session	Your mlusr session
quit	ends mlusr session	Your mlusr session
— end —		

Link control commands

There are two link control commands: enable and disable link.

Note: In this section, bolded text indicates text you input.

enable link

The enable link command puts the specified link in the enabled state. If the remote end is down, the link remains enabled but down. The normal response to enable is "Enable link *link_number*: successful." A descriptive error message is given if the command fails.

Command format:

```
mlusr> enable link link_number
```

Example:

```
mlusr> enable link 0  
Enable link 0: successful  
mlusr>  
  
Link 0 Up  
mlusr>
```

disable link

The disable link causes the specified link to go down, and remain down until it is reenabled. A descriptive error message is given if the command fails.

Command format:

```
mlusr> disable link link_number
```

Example:

```
mlusr> disable link 0  
  
Disable Link 0: successful  
mlusr>  
  
Link 0 disabled  
mlusr>
```

Link status commands

There are two link status commands: status link and get links.

status link

The status link command shows whether the link is up or down, enabled or disabled. If a link status changes involuntarily, a Link Up/Down message is displayed on the system console (if mlusr is logged in) and written to the SysLog file.

Command format:

```
mlusr> status link link_number
```

Example:

```
mlusr> status link 1
```

```
Link 1 : Up
```

```
mlusr>
```

get links

This command displays all configured links. If no links are configured, “NONE” is displayed.

Command format:

```
mlusr> get links
```

Example (CCR):

```
mlusr> get links
```

```
Number of Links: 1
```

```
Link ID:      0
```

```
Link Type:    MSL-1 link
```

```
Machine ID:   SL16
```

```
mlusr>
```


Examples (Meridian Link):

```
mlusr> get links
```

Number of Links: 3

```
Link ID:      0
Link Type:    MSL-1 link
Machine ID:   hdlcdest
Link ID:      1
Link Type:    Host link
Machine ID:   x25dest
Link ID:      2
Link Type:    MMail link
Machine ID:   MeridianMail
mlusr>
```

```
mlusr> get links
```

Number of Links: 3

```
Link ID:      0
Link Type:    MSL-1 link
Machine ID:   hdlcdest
Link ID:      1
Link Type:    Host link
Machine ID:   Lanlink
Link ID:      2
Link Type:    MMail link
Machine ID:   MeridianMail
mlusr>
```

Link configuration commands

The link control file (linkctl) contains information on all links to the Application Module or IPE Module, specifically the link number, link type (protocol used), and the file name where the link configuration parameters are stored. Each entry (one line of the file) corresponds to a link.

The link configuration commands do the following:

- display or change the link control file
- read or save the link control file
- display or change link configuration parameters
- save link configuration parameters
- read link configuration parameters

display linkctl

This command displays the contents of the link control file.

Command format:

```
mlusr> display linkctl
```

Example (CCR):

```
mlusr> display linkctl
```

Current Control File Image

```
0      HDLC      /usr/mlusr/conf/hdlcmInk.datafile
```

```
mlusr>
```

Example (Meridian Link):

```
mlusr> display linkctl
```

Current Control File Image

```
0      HDLC      /usr/mlusr/conf/hdlcmInk.datafile
```

```
1      X25       /usr/mlusr/conf/X25hInk.datafile
```

```
2      ASYNC     /usr/mlusr/conf/vlink.datafile
```

```
mlusr>
```

change linkctl

This command allows you to maintain entries within the link control file by specifying a link to display information and then opting to delete the link, leave it unchanged, or specify changes to it. The file name includes the complete directory path to a link configuration file (which contains parameter settings for the link). You can change the type of link going to the host, but only TCP/IP, X.25, and HDLC are currently supported.

Command format:

```
mlusr> change linkctl
```

In the following example, only the host link (link 1) information is changed to indicate that it uses HDLC rather than X.25 protocol.

Example:

```
mlusr> change linkctl
```

Current Control File Image

```
0      HDLC      /usr/mlusr/conf/hdlcmlnk.datafile
1      X25      /usr/mlusr/conf/x25hlnk.datafile
2      ASYNC    /usr/mlusr/conf/vlink.datafile
```

```
Current Entry > 0      HDLC      /usr/mlusr/conf/hdlcmlnk.datafile
```

```
Type :  "delete" to remove
```

```
        "<ret>" to keep as is,
```

```
        "<link number> <link type> <file name>" to change
```

```
Entry > <cr>
```

```
Current Entry > 1      X25      /usr/mlusr/conf/x25hlnk.datafile
```

```
Type :  "delete" to remove
```

```
        "<ret>" to keep as is,
```

```
        "<link number> <link type> <file name>" to change
```

```
Entry > 1      HDLC      /usr/mlusr/conf/hdlchlnk.datafile
```

```
Current Entry > 2      ASYNC    /usr/mlusr/conf/vlink.datafile
```

```
Type :  "delete" to remove
```

```
        "<ret>" to keep as is,
```

```
        "<link number> <link type> <file name>" to change
```

```
Entry > <cr>
```

— continued —

Example (continued):

New Entry

Type : "<ret>" end changes

"<link number> <link type> <file name>" add entry

Entry > <cr>

New Control File Image:

0 HDLC /usr/mlusr/conf/hdlcmlnk.datafile

1 HDLC /usr/mlusr/conf/hdlchlnk.datafile

2 ASYNC /usr/mlusr/conf/vlink.datafile

Confirm? (yes or no): y

In the following example, only the host link (link 1) information is changed to indicate that it uses TCP/IP rather than X.25 protocol.

N To change link 1 to use the TCP/IP protocol, type **LAN** in
the link type field, and type **lanhlnk** in the file name field.

t

e

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Command format:

mlusr> **change linkctl**

Example:

mlusr> **change linkctl**

Current Control File Image

0 HDLC /usr/mlusr/conf/hdlcmlnk.datafile

1 X25 /usr/mlusr/conf/x25hlnk.datafile

2 ASYNC /usr/mlusr/conf/vlink.datafile

Current Entry > 0 HDLC /usr/mlusr/conf/hdlcmlnk.datafile

Type : "delete" to remove

"<ret>" to keep as is,

"<link number> <link type> <file name>" to change

Entry > <cr>

— continued —

Example (continued):

Current Entry > 1 X25 /usr/mlusr/conf/x25hlnk.datafile

Type : "delete" to remove

 "<ret>" to keep as is,

 "<link number> <link type> <file name>" to change

Entry > 1 LAN /usr/mlusr/conf/lanhlnk.datafile

Current Entry > 2 ASYNC /usr/mlusr/conf/vlink.datafile

Type : "delete" to remove

 "<ret>" to keep as is,

 "<link number> <link type> <file name>" to change

Entry > <cr>

New Entry

Type : "<ret>" end changes

 "<link number> <link type> <file name>" add entry

Entry > <cr>

New Control File Image:

0 HDLC /usr/mlusr/conf/hdlcmlnk.datafile

1 LAN /usr/mlusr/conf/lanhlnk.datafile

2 ASYNC /usr/mlusr/conf/vlink.datafile

Confirm? (yes or no): y

Note: "HDLC", "X25", "LAN", and "ASYNC" must be entered in uppercase; if they are entered in lowercase, no error will be given but files will not be addressed correctly by the software. The pathname of the file must be in lowercase. The number of spaces between each parameter does not matter.

read linkctl

To use this command, you must specify the name of the link control file (from the /usr/mlusr/conf directory). You are prompted to accept or reject the new configuration.

Command format:

```
mlusr> read linkctl filename
```

Note: The file name should follow a slash character; for example, /hdlcmlnk.data.

Example:

```
mlusr> read linkctl /hdlcmlnk.data
```

New Control File Image:

```
0      HDLC      /usr/mlusr/conf/hdlcmlnk.data
```

Confirm? (yes or no): **y**

```
mlusr>
```

save linkctl

If you change the link control information, you can use the save linkctl command to save the new information in a new file to preserve the original information in the default link control file for possible later use. The save linkctl command saves the current link control information to the file specified. A directory path does not need to be included with the file name, because link control files are always stored in the usr/mlusr/conf directory.

The command displays current information and asks you to confirm that it should be saved. If you specify a file name that already exists, you are prompted to confirm that the file should be overwritten (replaced).

Command format:

```
mlusr> save linkctl filename
```

Note: The maximum length of the file name is 14 characters. The file name should follow a slash character.

Example:

```
mlusr> save linkctl /hdlchlnk.data
```

File "/usr/mlusr/conf /hdlchlnk.data" already exists. OK to overwrite?

Confirm? (yes or no): **y**

```
mlusr>
```

display link

This command displays the contents (parameter settings) of a link configuration file. Table 4 (following the description of the change link command) describes the parameters in more detail.

Command format:

```
mlusr> display link link_number
```

Example: Link 0 (LAPB) configuration

```
mlusr> display link 0
Protocol: HDLC                      Link type: 1
Machine ID: hdlcdest
Delay: 0
Port type: H                        Physical DTE(0)/DCE(1): 0
PDN type: 0                         Maximum Frame length: 135
Baud rate: 19200                    Fail timer: 50
RFS timer: 150                      Internal address: 1
Remote address: 3                   T1: 20
Maximum out frames (K): 7           Maximum trans attempts: (N2): 8

mlusr>
```

Example: Link 1 (TCP/IP) configuration (Meridian Link)

```
mlusr> display link 1

Protocol: LAN                        Link type: 2
Machine ID: Lanlink
Delay: 0
Port: 3000
```


Example: Link 1 (X.25) configuration (Meridian Link)

```
mlusr> display link 1
```

Protocol: X25	Link type: 2
Machine ID: x25dest	
Delay: 0	
Port type: X	Physical DTE(0)/DCE(1): 1
PDN type: 44	Maximum Frame length: 135
Baud rate: 19200	Fail timer: 150
RFS timer: 150	Internal address: 1
Remote address: 3	T1: 30
Maximum out frames (K): 7	Maximum trans attempts (N2): 7
Local DTE address: 000000990100	
Flow control negotiation: 0	Incoming packet size: 128
Outgoing packet size: 128	Incoming window size: 2
Outgoing window size: 2	Throughput negotiation used: 0
Incoming throughput class: 10	Outgoing throughput class: 10
Lowest LCN for DTE/DCE: -1	Highest LCN for DTE/DCE: -1
Lowest LCN: 1	Highest LCN: 4095
LOC LIC: -1	HOC HIC: -1
T10: 1800	
T11: 2000	T12: 1800
T13: 1800	T14: 600
T15: 1500	T16: 1300
Maximum T12 retries: 3	Maximum T13 retries: 3

```
mlusr>
```

Example: Link 2 (ASYNC) configuration (Meridian Link)

```
mlusr> display link 2
```

Protocol: ASYNC	Link type: 3
Machine ID: MeridianMail	
Delay: 0	
Port number: tty03	

change link

The change link command modifies link configuration parameters such as baud rate and timers. Table 4 provides detailed information on each parameter. Some parameters cannot be changed; these are indicated in the following description and in Table 4.



CAUTION

Risk of data loss

Do not use the change link command without the direction of Nortel support personnel or Host Computer support.

Command format:

```
mlusr> change link link_number
```

The system takes you through each parameter, one at a time, displaying the parameter name, the valid values or allowed options for the parameter (if appropriate), and the current value of the parameter.

For each parameter you have three possible options:

- 1 Enter <cr> (carriage return) to leave the parameter as is.
- 2 Enter a new value within operational limits.
- 3 Enter <escape> <cr> to quit change functions.

Values entered outside operational limits are rejected, and you are prompted for that value again. When you have finished going through all the parameters appropriate to the link type, you are asked to confirm any changes you made. Changes are saved in memory and are in effect only until the next time the system is restarted. See the save link command for information on saving your changes permanently.

In the following example, the change link command is used to review all parameters associated with link 0. Only the Machine ID (from hdlcdest to SL18) and MVME705B port configuration (from DTE to DCE) are changed.

Example:

```
mlusr> change link 0
Machine ID
Current      hdlcdest
> SL18
Delay
Range [0 60000]
Current      0
> <cr>
Physical DTE(0)/DCE(1)
Options [0 1]
Current 0
> 1
PDN type
Range [0 88]
Current 0
> <cr>
Baud rate
Options [50 75 150 300 600 1200 2400 4800 9600 19200 38400 48000
56000 64000 12]
Current 19200
> <cr>
Fail timer
Range [0 9999]
Current 150
> <cr>
RFS timer
Range [0 9999]
Current 150
> <cr>
Internal address
Options [1 3]
Current 1
> <cr>
```

— continued —

Example (continued)::

```

Remote address
Options [1 3]
Current 3
> <cr>
T1
Range [0 9999]
Current 30
> <cr>
Maximum out frames (K)
Range [1 7]
Current 7
> <cr>
Maximum trans attempts (N2)
Range [1 9999]
Current 7
> <cr>
Confirm (yes or no): yes
mlusr>

```

N If you enter yes, the memory image is updated but not the file.

t To update the file, see the save link command.

e

:

The following parameters cannot be changed:

- Protocol
- Link type
- Port type
- Maximum Frame length (X.25)
- Lowest LCN for DTE/DCE (X.25)
- Lowest LCN (X.25)
- LOC LIC (X.25)
- Highest LCN for DTE/DCE (X.25)
- Highest LCN (X.25)
- HOC HIC (X.25)

Table 4
Link parameters

Link parameter	Allowed values (defaults in parentheses)	Description
X.25, TCP/IP, LAPB, and ASYNC parameters:		
Protocol*	X25, LAN (for TCP/IP), HDLC, ASYNC	Link protocol used
Link type*	1, 2, 3	Type of link (1 = Meridian Link, 2 = Host link, 3 = MML)
Machine ID	(SL16) (x25dest) (Lanlink) (MeridianMail)	Logical name assigned to the attached host
Delay	(0)–9999	Maximum time (in seconds) between packet transmissions
ASYNC only :		
Port number	(tty03)	
TCP/IP only		
Port	(3000)	
X.25 and LAPB parameters:		
Port type*	X, H	H = HDLC, X = X.25
Physical DTE/DCE	0, 1	0 if the AM or IPE Module port is configured as DTE; 1 if the port is configured as DCE (default)
* Parameters marked with an asterisk (*) cannot be changed.		
— continued —		

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
PDN type	0, 40–48	Packet data network type. This parameter is dependent on the type of X.25 network configured on the host. The possible values are 0 — LAPB 40 — Datex-P (Germany) 41 — Transpac (France) 42 — PPS (United Kingdom) 43 — Datapac (Sweden) 44 — Telenet (USA) 45 — DDN (USA) 46 — Accunet (USA) 47 — Datapac (Canada) 48 — Tymnet (USA) The default values are 0 for LAPB and 44 for X.25.
Maximum Frame length*	135	
Baud rate	300, 600, 1200, 2400, 4800, 9600, (19200), 38400, 48000, 56000, 64000	Must be identical to that specified on the Meridian 1 or host computer configuration; if modems are used, must also match baud rate of the modem
Fail timer	0–(150)–9999	Timer value (in 1/10 second increments) for monitoring the signals that indicate link failure
RFS timer	0–(150)–9999	Timer value (in 1/10 second increments) for monitoring CTS or DTR signals after line opening
— continued —		

* Parameters marked with an asterisk (*) cannot be changed.

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
Internal address	(1), 3	1 for DCE; 3 for DTE
Remote address	1, (3)	3 for DCE; 1 for DTE
T1	0–(30)–9999	Frame recovery time (in 1/10 second increments); must be identical to the time specified on the host computer configuration
Maximum out frames (K)	1–(7)	LAPB window size; must be identical to the size specified on the host computer configuration
Maximum trans attempts (N2)	1–(7)–9999	Maximum number of retries to complete a transmission; must be identical to the number specified on the host computer configuration
Local DTE address	000000990100	Specifies the local DTE address of the physical line X.25 “call request” address that identifies the AM or IPE Module. When the host sends the X.25 call request packet to set up the SVC, it must specify the local DTE address of the AM or IPE Module. The default value is “000000990100”.
— continued —		

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
X.25-only parameters:		
Flow control negotiation	(0)–1	An X.25 service which allows flow control parameters (packet size and window size) to be negotiated between the host and the AM or IPE Module. Not supported by the AM or IPE Module. Default value is 0 (no flow control negotiation). Use flow control negotiation (packet size and window size) 0 = no; 1 = yes
Incoming packet size	16, 32, 64, (128), 256, 512, 1024, 2048, 4096	Maximum X.25 packet size; must be identical to the size specified on the host computer configuration
Outgoing packet size	16, 32, 64, (128), 256, 512, 1024, 2048, 4096	Maximum X.25 packet size; must be identical to the size specified on the host computer configuration
Incoming window size	1–(2)–7	Maximum number of outstanding incoming packets without an acknowledgment
Outgoing window size	1–(2)–7	Maximum number of outstanding outgoing packets without an acknowledgment
Throughput negotiation used	(0)–1	Specify whether throughput negotiation may be used 0 = no; 1 = yes
— continued —		

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
Incoming throughput class	3–(10)–12	Maximum amount of incoming information that can pass through a saturated network 3 = 75 bps; 4 = 150 bps 5 = 300 bps; 6 = 600 bps 7 = 1200 bps; 8 = 2400 bps 9 = 4800 bps; 10 = 9600 bps 11 = 19200 bps 12 = 38400 bps
Outgoing throughput class	3–(10)–12	Maximum amount of outgoing information to pass through a saturated network 3 = 75 bps; 4 = 150 bps 5 = 300 bps; 6 = 600 bps 7 = 1200 bps; 8 = 2400 bps 9 = 4800 bps; 10 = 9600 bps 11 = 19200 bps 12 = 38400 bps
Lowest LCN for DTE/DCE*	-1	Specifies the lowest X.25 virtual circuit number that will be assigned for an incoming (if DTE) or outgoing (if DCE) X.25 call request. Not used by the AM or IPE Module. Default value is -1.
Highest LCN for DTE/DCE*	-1	Specifies the highest X.25 virtual circuit number that will be assigned for an incoming (if DTE) or outgoing (if DCE) X.25 call request. Not used by the AM or IPE Module. Default value is -1.
— continued —		

* Parameters marked with an asterisk (*) cannot be changed.

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
Lowest LCN*	1	Specifies the lowest X.25 virtual circuit number that will be assigned for an incoming/outgoing X.25 call request. Default value is 1.
Highest LCN*	4095	Specifies the highest X.25 virtual circuit number that will be assigned for an incoming/outgoing X.25 call request. Default value is 4095.
LOC LIC*	-1	Specifies the lowest X.25 virtual circuit number that will be assigned for an incoming (if DCE) or outgoing (if DTE) X.25 call request. Not used by the AM or IPE Module. Default value is -1.
HOC HIC*	-1	Specifies the highest X.25 virtual circuit number that will be assigned for an incoming (if DCE) or outgoing (if DTE) X.25 call request. Not used by the AM or IPE Module. Default value is -1.
T10	0–(1800)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for an X.25 restart confirmation packet after sending an X.25 restart packet to host.
T11	0–(2000)–9999	Amount of time (in 1/10 second increments) the host will wait for an X.25 call accept packet after sending an X.25 call request packet to the AM or IPE Module.
— continued —		

* Parameters marked with an asterisk (*) cannot be changed.

Table 4
Link parameters (continued)

Link parameter	Allowed values (defaults in parentheses)	Description
T12	0–(1800)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for an X.25 reset confirmation packet after sending an X.25 reset request packet to the host
T13	0–(1800)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for an X.25 clear confirmation packet after sending an X.25 clear request packet to the host
T14	0–(600)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for a packet with any P(R) value after sending an X.25 data packet to the host
T15	0–(1500)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for a packet with a P(R) value that acknowledges a transmitted X.25 data packet to the host
T16	0–(1300)–9999	Amount of time (in 1/10 second increments) the AM or IPE Module will wait for an X.25 interrupt confirmation packet after sending an X.25 interrupt request packet to the host
Maximum T12 retries	0–(3)–9999	Maximum number of times the AM or IPE Module sends reset requests due to T12 timeouts
Maximum T13 retries	0–(3)–9999	Maximum number of times the AM or IPE Module sends clear requests due to T13 timeouts
— end —		

save link

This command saves the link parameters to the file specified. If no file name is provided, the file name specified in the link control file is used and you are asked to confirm that the default file should be overwritten (replaced). A full directory path must be specified with the file name (for example /usr/mlusr/conf/mylink).

Command format:

```
mlusr> save link link_number [filename]
```

Example:

To save parameters for link number 1 using the default configuration file:

```
mlusr> save link 1
```

File "/usr/mlusr/conf/x25hlnk.datafile" already exists. OK to overwrite?
Confirm? (yes or no): y

```
mlusr>
```

Example:

To save parameters for link number 1 in a file called savedata:

```
mlusr> save link 1 /usr/mlusr/conf/savedata
```

```
mlusr>
```

read link

Use this command to reconfigure a link from the parameters saved in a file. If you do not provide a file name, the file name specified in the link control file is used. Configuration files can be read from any specified directory.

You are asked to confirm the parameters. A “yes” response to the confirm prompt reconfigures the link. A “no” response aborts the command.

Command format:

```
mlusr> read link link_number [filename]
```

Note: The maximum length of the file name is 14 characters. The file name must follow a slash character; for example, /saveconfig1.

Example:

To reconfigure link number 1 from file saveconfig1:

```
mlusr> read link 1 /saveconfig1
```

Protocol: X25	Link type: 2
Machine ID: x25dest	
Delay: 0	
Port type: X	Physical DTE(0)/DCE(1): 1
PDN type: 44	Maximum Frame length: 135
Baud rate: 19200	Fail timer: 150
RFS timer: 150	Internal address: 1
Remote address: 3	T1: 30
Maximum out frames (K): 7	Maximum trans attempts (N2): 7
Local DTE address: 000000990100	
Flow control negotiation: 0	Incoming packet size: 128
Outgoing packet size: 128	Incoming window size: 2
Outgoing window size: 2	Throughput negotiation used: 0
Incoming throughput class: 10	Outgoing throughput class: 10
Lowest LCN for DTE/DCE: -1	Highest LCN for DTE/DCE: -1
Lowest LCN: 1	Highest LCN: 4095
LOC LIC: -1	HOC HIC: -1
T10: 1800	
T11: 2000	T12: 1800
T13: 1800	T14: 600
T15: 1500	T16: 1300
Maximum T12 retries: 3	Maximum T13 retries: 3
Confirm? (yes or no): y	

Link statistics command

The link statistics command generates a protocol-specific list of statistics for the link number you specify. Peg counts for the various frame/packet types sent or received are displayed, along with other information such as timeouts, number of active virtual circuits, and number of signal losses. The statistics differ for X.25 and HDLC protocols.

Command format:

```
mlusr> statistics link link_number
```

Example: Link 0 (LAPB) statistics

```
mlusr> statistics link 0  
CPU ID 2          Port 0  
Reason 0          Invalid frames 0  
RXD I frames 140  TXD I frames 137  
RR frames 275     RNR frames 0  
REJ frames 0      SABM frames 0  
UA frames 0       FRMR frames 0  
DM frames 0       DISC frames 0  
T1 frames 0       N2 frames 0  
Signals lost 0    Signal drops 0  
mlusr>
```

Example: Link 1 (TCP/IP) statistics (Meridian Link)

```

mlusr> statistics link 1
Host Connection Count 1
Connection Abort: Retransmission error 0
Connection Abort: User timeout 0
Connection Abort: Keep alive timeout 0
Retransmit Count 12
Packets Resized Smaller 0
Number ACKs Generated 4688
Packets Dropped: Not in window 0
Packets Dropped: Bad checksum 0
Duplicate Packets Received 1
Out of Order Packets Received 0
Packets Dropped: Out of memory 0
Total Packets Received 11447
Total Packets Transmitted 11547
Total Bytes Received 1204636
Total Bytes Transmitted 149853
mlusr>

```

Example: Link 1 (X.25) statistics (Meridian Link)

```

mlusr> statistics link 1
CPU ID 2                      Port 1
Circuit reference 536883250    Reason 0
More Nststi 0                  Active VCS 1
Type 1    call direction
Invalid packets 0              Setup packets 0
Clear packets 0                TXD data packets 117
RXD data packets 90 T          XD int packets 0
RXD int packets 0              RR packets 117
RNR packets 0                  REJ packets 0
Reset packets 0                Restart packets 0
T20 timeouts 0                 T21 timeouts 0
T22 timeouts 0                 T23 timeouts 0
T24 timeouts 0                 T25 timeouts 0
T26 timeouts 0                 Length remote 10
Remote DTE @ B81               Reverse charge request
mlusr>

```

Example: Link 2 statistics (Meridian Link)

mlusr> **statistics link 2**
Report Period 9887 seconds

Received Packets Count:

Sync Packets 0	User Data Packets 0
Poll Packets 0	Termination Packets 0
Ack Packets 0	Error Ack Packets 0

Sent Packets Count:

Sync Packets 2772	User Data Packets 0
Poll Packets 0	Termination Packets 0
Ack Packets 0	Error Ack Packets 0

Received Error Packets Counts:

Format 0	Bad Check Sum 0
Bad Ack Seq No 0	Bad Nak Seq No 0
Bad Data Seq No 0	Bad Packet Type 0

Peak Registrations 6357
Cur Processes Registered 0
Cur Total Processes Registered 0
Last Reset 0
Last Synchronization

Meridian Link messages

The association services commands (described in following pages of this chapter) provide a detailed view of the messages that pass across link 1. Some of these commands enable you to obtain information on particular messages, while ignoring other messages. Message types allow you to refer to specific messages when you use Meridian Link commands.

Message types

Meridian Link Release 3 and later software assigns a message type to every Meridian Link message. This message type (a two-byte hexadecimal number) can be used to do the following:

- record all or selected types of messages
- filter all or selected types of messages
- monitor all or selected types of messages
- obtain statistics on selected types of messages

To see a list of message types, type **help msgtypes** and press [Return].

Message names

The message names used in earlier versions of Meridian Link software may still be used in the commands described above; however, any new messages (introduced in Release 3 or later software) can only be referenced by message type. Type **help messages** and press [Return] at the “mlusr>” prompt to see a list of valid message names.

Specifying message types in commands

Many of the association services commands include message as an optional parameter in the command format. You can specify particular messages by substituting any of the following for the message parameter:

- message type (0801, for example)
- message name (Make Call, for example)
- all (to select all messages)
- allin (to select all incoming messages to Meridian Link from the host)
- allout (to select all outgoing messages from Meridian Link to the host)

Association services commands

These commands provide information covering application associations currently established on the Application Module or IPE Module.

get associations

This command displays information on current active associations. The mlusr association is always shown with an application ID of ADMIN.nnnn, where nnnn is a number.

The association ID, displayed for each association by invoking this command, is used in the association services commands (described in the following pages).

Command format:

```
mlusr> get associations
```

Example:

mlusr> **get associations**

Association ID: 1
Application ID ADMIN.1334
Host Link ID: NONE
Meridian 1 Link ID: NONE
Meridian 1 Customer Number: NONE
Meridian Mail Link ID: NONE
Registered Services: 1

Association ID: 2
Application ID API_TOOL
Host Link ID: 1
Host Name: X25dest
Meridian 1 Link ID: 0
Meridian 1 Name: SL16
Meridian 1 Customer Number: 1
Meridian Mail Link ID: 2
Meridian Mail Name: Meridian Mail
Registered Services: 97 98 100 101

mlusr>

get directory numbers

Registering DN's with the Meridian 1, using the DN Registration message, allows an application to specify DN's for which it would like to receive events. The `get dn` command displays one of the following:

- ALL—meaning that the application has registered all DN's within the selected customer number on Meridian 1 for the specified association
- a list of DN's
- NONE—meaning that the application has registered no DN's for the specified association

Command format:

```
mlusr> get dn association_id
```

Example:

To obtain the list of DN's registered for `association_id 1`:

```
mlusr> get dn 1
```

Number of DN's registered: ALL

```
mlusr>
```

get resource

For some Meridian Link features, the application must acquire a resource from Meridian 1 in order to perform a certain function. For example, an application must acquire a Control DN (CDN) before it can route the call on behalf of that CDN. Resources include CDNs, ACD queues, ACD positions, and devices (such as telephone sets or trunks).

The get resource command displays all the resources acquired by an application for the specified association. Acquired resources may be expressed in any of the following ways:

- all resources
- a single or all CDNs
- a single or all queues
- a single or all ACD positions
- a single or all DN devices
- a single or all TNs
- a voice port

Only one association may acquire a particular resource. Acquiring all resources precludes all other associations from acquiring any resources that are configured under the same customer number on Meridian 1.

Command format:

```
mlusr> get resource association_id
```

Example:

To obtain the list of resources acquired by an application for association_id 2:

```
mlusr> get resource 2
```

```
Acquired Resource List Association 2
Single Voice Port 3
Single Voice Port 4
```

```
mlusr>
```

message statistics

The statistics commands collect and display message statistics (number of each type of message flowing over the link). There are four statistics commands. These include

- enable message statistics collection
- disable message statistics collection
- clear messages for statistics
- get message statistics

Type **help msgtypes** and press [Return] to see a list of all message types that can be selected in the messages parameter. You can also type **help messages** and press [Return] to see a list of message types supported by Meridian Link Release 2 software, up to Release 4.

Enable message statistics collection

This command starts accumulation of message statistics for the specified association. Statistics can be collected for either all or selected messages.

Command format:

```
mlusr> enable msgstat association_id
```

Example:

To enable message statistics collection for association_id 1:

```
mlusr> enable msgstat 1
```

Enable statistics successful

```
mlusr>
```

Disable message statistics collection

This command stops the accumulation of statistics for an association—assuming that the specified statistics collection had been enabled. Statistics collection can be disabled for all or selected messages.

Command format:

```
mlusr> disable msgstat association_id [message] [message ...]
```

Example:

To disable message statistics collection for association ID 1:

```
mlusr> disable msgstat 1
```

Disable statistics successful

```
mlusr>
```

Clear messages for statistics

This command resets the statistics to 0 for all messages for the specified association ID.

Command format:

```
mlusr> clear msgstat association_id
```

Example:

To clear message statistics peg counts for association_id 1:

```
mlusr> clear msgstat 1
```

Clear statistics successful

```
mlusr>
```

Get message statistics

This command displays peg counts (the current statistics collected since the last get command) for specified messages on the specified association.

Command format:

```
mlusr> get msgstat association_id message [message ...]
```

Example:

To obtain the statistics collected for message mlmakecall for association ID 1:

```
mlusr> get msgstat 1 0801
```

```
Facility Enabled
Makecall        125
```

```
mlusr>
```

To get all messages, enter:

```
mlusr> get msgstat 1 all
```

```
Facility Enabled
Enable Stat Collecting Response    1
Get Statistics                      2
Get Statistics Response             1
mlusr>
```

filter commands

Five filter commands enable you to control which Meridian Link messages pass across the link. These are

- set filter
- enable filter
- disable filter
- clear filter
- get filter status

Type **help msgtypes** and press [Return] to see a list of all message types that can be selected in the messages parameter. You can also type **help messages** and press [Return] to see a list of message types supported up to Meridian Link Release 4 software.

Set filter

This command adds message types to the list of messages that are to be filtered out.

Command format:

```
mlusr> set filter association_id message [message ...]
```

Example:

To filter makecall and initiate transfer messages for association_id 1:

```
mlusr> set filter 1 0801 0804
```

or

```
mlusr> set filter 1 mlmakecall inittran
```

Set filter successful

```
mlusr>
```


Enable filter

This command turns on filtering of messages. Before entering this command, use the set filter command to specify which message types should be filtered out.

Command format:

```
mlusr> enable filter association_id
```

Example:

To enable filtering for association_id 1:

```
mlusr> enable filter 1
```

Enable filter successful

```
mlusr>
```

Disable filter

This command turns off filtering for a specified association ID. The list of messages set for filtering is still intact, should you reenable filtering.

Command format:

```
mlusr> disable filter association_id
```

Example:

To disable filtering for messages set for association_id 1:

```
mlusr> disable filter 1
```

Disable filter successful

```
mlusr>
```

Clear filter

This command removes one or more message types from the list of messages to be filtered out.

Command format:

```
mlusr> clear filter association_id message [message ...]
```

Example:

To stop filtering out two messages (make call and initiate transfer), for association ID 1:

```
mlusr> clear filter 1 0801 0804  
or  
mlusr> clear filter 1 mlmakecall mlinitxtr
```

Clear filter successful

```
mlusr>
```

Get filter status

This command displays the filter status of messages for the specified association.

Command format:

```
mlusr> get filter association_id
```

Example:

For association_id 1

```
mlusr> get filter 1  
Facility Enabled
```

```
Messages Filtered:  
Make Call  
Init Transfer
```

record commands

Five record commands enable you to control recording of specified messages flowing across the link for an association. The messages are recorded in hexadecimal format to files on the Application Module or IPE Module hard disk (see Figure 10). The commands are as follows:

- set record
- enable record
- disable record
- clear record
- get record

Type **help msgtypes** and press [Return] to see a list of all message types that can be selected in the messages parameter. You can also type **help messages** and press [Return] to see a list of message types supported up to Meridian Link Release 4 software.

Use the view command (described later in this chapter) to look at record files, which use the format `rec_XXX.yyy`; where `XXX` is a number starting at 000 for the first file and incrementing by 1 for each new file, and `yyy` is the association ID of the application for which messages are being recorded.

A new file is created whenever an enable recording command is given. A new file is also created when the `rec_XXX.yyy` file exceeds 100 kbytes.

Figure 10
Example of a recording file

```

To : hlink (assoc id=2) Progress Wed May 20 20:42:04 1992
Message:
FF 0A 00 25 02 80 01 08 08 5E 30 08 00 08 35 30 30 36 31 08 00 08 35 30 31 31 35
03 70 2E 04 01 02 3F 04 01 08

To : hlink (assoc id=2) Status Change Wed May 20 20:42:04 1992
Message:
FF 0A 00 19 02 00 00 08 0F 00 37 04 01 08 36 08 00 08 35 30 30 36 38 03 01

To : hlink (assoc id=2) Release Response Wed May 20 20:42:04 1992
Message:
FF 0A 00 15 02 80 03 08 0C 07 30 08 00 00 35 30 30 36 71 03 00

From: hlink (assoc id=2) Answer Wed May 20 20:42:05 1992
Message:
FF 0A 00 12 02 00 01 08 09 FF 30 08 00 00 35 31 30 32

```

Set record

Use this command to add specified message types to the list of messages to be recorded.

Command format:

```
mlusr> set record association_id message [message ...]
```

Example:

To set recording for two messages, makecall and calloff, for association ID 2:

```
mlusr> set record 2 0801 0807
```

or

```
mlusr> set record 2 mlmakecall mlcalloff
```

Set record successful

```
mlusr>
```

Enable record

This command turns on message recording. Before issuing this command, use `get record` to confirm the list of messages to be recorded. If necessary, use `set record` or `clear record` to modify the list. Recording stays active until you disable it or exit `mlusr`.

Command format:

```
mlusr> enable record association_id
```

Example:

To enable recording for messages set for `association_id 2`:

```
mlusr> enable record 2
```

Enable record successful

```
mlusr>
```

Disable record

This command turns off message recording if it had been enabled. Recording is also disabled when you exit `mlusr`. Disabling message recording does not alter the list of messages that were set for recording.

Command format:

```
mlusr> disable record association_id
```

Example:

To disable recording for messages set for `association_id 2`:

```
mlusr> disable record 2
```

Disable record successful

```
mlusr>
```

Clear record

This command clears the specified message types from the list of messages to be recorded.

Command format:

```
mlusr> clear record association_id message [message ...]
```

Example:

To clear recording for two messages, makecall and calloffer, for association ID 2:

```
mlusr> clear record 2 0801 0807  
or  
mlusr> clear record 2 mImakecall mIcallofr
```

Clear record successful

```
mlusr>
```

Get record

This command displays the current message recording status, and the current list of messages specified for recording.

Command format:

```
mlusr> get record association_id
```

Example:

To obtain the current message recording status for association_id 2:

```
mlusr> get record 2  
  
Facility Enabled  
  
Messages Recorded:  
    Make call  
    Call offered
```

```
mlusr>
```

monitor commands

The monitor commands display messages flowing on the identified *association_id* on the system console. The messages appear in hexadecimal format. There are five monitoring commands:

- set monitor
- enable monitor
- disable monitor
- clear monitor
- get monitor

The format of the monitor file displayed on the console is the same as for the recording file. See Figure 10 in the record commands.

Type **help msgtypes** and press [Return] to see a list of all message types that can be selected in the *messages* parameter. You can also type **help messages** and press [Return] to see a list of message types supported by Meridian Link software up to Release 4.

Set monitor

Use this command to add the message types to the list of messages to be monitored.

Command format:

```
mlusr> set monitor association_id message [message ... ]
```

Example:

To monitor makecall and answer messages for association ID 1:

```
mlusr> set monitor 1 0801 0809
```

or

```
mlusr> set monitor 1 mlmakecall mlanswer
```

Set monitor successful

```
mlusr>
```

To monitor all outgoing messages, enter:

```
mlusr> set monitor 2 allout
```

Enable monitor

This command turns on the message monitoring. Before using the enable monitor command, use the get monitor command to confirm the list of messages to be monitored. If necessary, use set monitor or clear monitor to modify the list.

Command format:

```
mlusr> enable monitor association_id
```

Example:

To enable monitoring for association_id 1:

```
mlusr> enable monitor 1
```

Enable monitor successful

```
mlusr>
```


Disable monitor

This command turns off message monitoring. It does not alter the list of messages that were set for monitoring.

Command format:

```
mlusr> disable monitor association_id
```

Example:

To disable monitoring for messages set for association_id 1:

```
mlusr> disable monitor 1
```

Disable monitor successful

```
mlusr>
```

Clear message for monitoring

This command clears the specified message types from the list of messages that are to be monitored.

Command format:

```
mlusr> clear monitor association_id message [message ...]
```

Example:

To clear monitoring of two messages, mlmakecall and mlanswer, for association_id 1:

```
mlusr> clear monitor 1 0801 0809
```

or

```
mlusr> clear monitor 1 mlmakecall mlanswer
```

Clear monitor successful

```
mlusr>
```

To clear all messages, enter:

```
mlusr> clear monitor 1 all
```

Get monitor status

This command displays the current monitor status and a list of the messages to be monitored.

Command format:

```
mlusr> get monitor association_id
```

Example:

To get the status for association_id 1:

mlusr> **get monitor 1**

Facility Enabled

Messages Monitored :

Make call

Answer

mlusr>

traffic commands

The traffic commands count messages flowing to and from an application over a period of time. There are three traffic commands, as follows:

- enable traffic
- disable traffic
- get traffic

Enable traffic

This command turns on traffic reporting for the specified association.

Command format:

```
mlusr> enable traffic association_id [period] [file_name] [lpr]  
[terminal]
```

Reports are generated every 5, 10, 15, 30, or 60 minutes (as specified in the *period* parameter; 60 is the default). The report is sent to the user's terminal (if **terminal** is specified), the system printer (if **lpr** is specified), or to a file named *file_name.association_id*. (if *file_name* is specified).

If no destination is specified, the report is sent to a default file (*traffic.association_id*), in directory /usr/mlusr/traf. Normally, *lpr* is not specified because Meridian Link systems do not have printers.

In the following example, traffic is monitored for association ID 1 and reports are generated every five minutes to the default file traffic.1.

Example:

```
mlusr> enable traffic 1 5  
Enable traffic successful
```

Disable traffic

This command turns off the traffic reporting for the specified association.

Command format:

```
mlusr> disable traffic association_id
```

Example:

To disable traffic reporting for association_id 1:

```
mlusr> disable traffic 1  
Disable traffic successful
```

Get traffic

This command displays the traffic information (period, filename, printer and terminal) for the specified association, which has traffic turned on.

Command format:

```
mlusr> get traffic association_id
```

Example:

To get the status for association_id 1:

```
mlusr> get traffic 1  
Traffic is enabled for Association 1
```

```
Period   : 5  
Filename : traffic.1  
Printer  : YES  
Terminal : YES
```

Example: Traffic report

Application Message Traffic Report Tue Oct 26 15:12:31 1993

Application = ADMIN.4017; Association = 1; Service(s) = 1
 MSL-1 Link = None; Host Link = None; Meridian Mail Link = None
 Filename = traffic.1; Time period = 5 minutes

Meridian Link Messages

=====

<0100> messages:

AppReg AppRegRp AppRel AppRelRp DnReg DnRegRp DnRel DnRelRp
 00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 GetAssoc AssocRp GetRegDn RegDnRp AppMon AppMonRp MonStop MonStopRp
 00000002 00000000 00000000 00000000 00000000 00000000 00000000 00000000
 AppRelId
 00000000

<0200> messages:

ConfLk ConfLkRp EnbLk EnbLkRp DisbLk DisbLkRp LkStatus StatusRp
 00000000 00000000 00000000 00000000 00000000 00000000 00000002 00000002
 LkStats StatsRp PerfDiag DiagRp GetCLk GetCLkRp TraceLk TrLkRp
 00000002 00000002 00000000 00000000 00000001 00000001 00000000 00000000
 UntrLk UntrLkRp LoopTst LoopRp DeCnLk DeCnLkRp
 00000002 00000002 00000000 00000000 00000000 00000000

<0300> messages:

EnlRec EnlRecRp DisRec DisRecRp SetRec SetRecRp ClrRec ClrRecRp
 00000001 00000001 00000000 00000000 00000000 00000000 00000000 00000000
 GetRec GetRecRp
 00000001 00000001

<0400> messages:

EnlMon EnlMonRp DisMon DisMonRp SetMon SetMonRp ClrMon ClrMonRp
 00000001 00000001 00000001 00000001 00000000 00000000 00000001 00000001
 GetMon GetMonRp
 00000002 00000002

— continued —

Example: Traffic report (continued)

<0600> messages:

```
EnlFil  EnlFilRp DisFil  DisFilRp SetFil  SetFilRp ClrFil  ClrFilRp
00000001 00000001 00000001 00000001 00000000 00000000 00000000 00000000
GetFil  GetFilRp
00000001 00000001
```

<1300> messages:

```
Polling ContTest ContRp  ContMsg
00000000 00000001 00000001 00000000
```

<1600> messages:

```
EnlTraf EnlTraRp DisTraf DisTraRp GetTraf GetTraRp
00000000 00000001 00000000 00000000 00000000 00000000
```

Summary:

Total Meridian Link messages sent by application: 16

Total Meridian Link messages received by application: 17

Link tracing commands

Unlike message recording or monitoring, which record or display messages flowing on a specified stream (association ID), message tracing records all messages flowing on a link or through the system.

A link trace writes application layer messages flowing over the link to a file with a hexadecimal format. Message dumps are labeled with time stamp, message name, and direction of flow.

There are two levels of link traces. Trace level 0 (the default) traces all messages; trace level 1 traces all but polling messages.

Files are recirculated every 48 hours to avoid overflowing the file system. The default file names used by trace are as follows:

- For link 0: /usr/mlusr/trace/link0.trace
- For link 1: /usr/mlusr/trace/link1.trace
- For link 2: /usr/mlusr/trace/link2.trace
- For trace main: /usr/mlusr/trace/main.trace

Use trace link or trace main to turn on a trace. Use untrace link or untrace main to turn off a trace.

trace link

The trace link command records all messages that are sent across a link.

Command format:

```
mlusr> trace link link_number [trace_level] [file_name]
```

trace main

The trace main command records all messages that are sent to and from the Application Module or IPE Module regardless of link or association ID.

Command format:

```
mlusr> trace main [trace_level] [file_name]
```

untrace link

Use untrace link to turn off a trace that was initiated by the trace link command.

Command format:

```
mlusr> untrace link link_number
```

untrace main

The untrace main to turn off a trace that was initiated by the trace main command.

Command format:

```
mlusr> untrace main
```

Use the view command to see the trace file. (See the view command later in this chapter for more information on selecting and viewing files.) The following are examples of trace messages in trace files.

Example: trace main

```
05/20/92 20:41:37 to MLappl (assoc id=1) Trace Tsmain Response
FF 0A 00 0D 01 80 04 09 03 83 71 03 00
05/20/92 20:41:38 from hlink (assoc id=2) Make Call
FF 0A 00 1D 02 00 02 08 01 1A 30 08 00 00 35 31 30 39 31 08 00 00 35 31 30 38 34
03 01
05/20/92 20:41:38 to mlink (assoc id=2) Outgoing ISDN/AP Msg: CON
FF 0A 00 28 00 00 00 07 01 00 2C 1E 03 1B 00 00 00 02 16 0E 00 02 00 01 01 00 00
00 00 00 00 00 00 02 02 9A 15 8A 15
05/20/92 20:41:38 from mlink (assoc id=0) Incoming ISDN/AP Msg: CRS
FF 0A 00 2E 00 00 00 07 02 00 2C 24 03 21 00 00 00 02 16 0F 00 02 00 01 00 0A 00
00 0E 8B 00 00 00 00 02 02 9A 15 8A 15 3D 01 08 3E 01 08
05/20/92 20:41:38 to hlink (assoc id=2) Progress
FF 0A 00 25 02 80 02 08 08 00 30 08 00 08 35 31 30 39 31 08 00 08 35 31 30 38 35
03 01 2E 04 00 0A 3F 04 0E 8B
```

Example: trace link 0

```
05/20/92 20:41:33 to PBX CALDIS link 0
03 15 00 00 00 02 16 2E 00 01 00 01 00 00 00 00 00 00 02 00 AA 15
05/20/92 20:41:34 from PBX USM link 0
03 19 00 00 03 05 16 1A 00 00 00 01 37 02 03 05 36 02 51 AA 3B 01 08 38 01 01 03
19 00 00 03 05 16 1A 00 00 00 01 37 02 03 05 36 02 51 AA 3B 01 08 38 01 05 03 1
9 00 00 03 06 16 1A 00 00 00 01 37 02 03 06 36 02 51 A2 3B 01 08 38 01 01 03 19
00 00 03 06 16 1A 00 00 00 01 37 02 03 06 36 02 51 A2 3B 01 08 38 01 05 03 15 00
00 00 02 16 2E 00 01 00 01 01 00 00 00 00 00 02 00 AA 15
05/20/92 20:41:34 from PBX POLL link 0
01 08 00 00 00 00 13 25 81
05/20/92 20:41:35 from PBX CALDIS link 0
03 15 00 00 00 02 16 2E 00 01 00 01 02 00 00 00 00 00 02 00 3A 15
05/20/92 20:41:36 to PBX CON link 0
03 1B 00 00 00 02 16 0E 00 01 00 01 01 00 00 00 00 00 00 00 02 02 6A A5 11
```

Example: trace link 1

```
05/22/92 16:02:46 from host Release link 1
FF 0A 00 12 02 00 03 08 0B FF 30 08 00 00 35 31 30 33
05/22/92 16:02:46 to host Release Response link 1
FF 0A 00 19 02 80 03 08 0C 94 30 08 00 00 35 31 30 33 71 03 01 78 04 10 0C
05/22/92 16:02:46 from host Make Call link 1
FF 0A 00 1D 02 00 01 08 01 12 30 08 00 00 35 30 30 36 31 08 00 00 35 30 31 31 34
03 01
05/22/92 16:02:46 from host Make Call link 1
FF 0A 00 1D 02 00 02 08 01 00 30 08 00 00 35 31 30 39 31 08 00 00 35 31 30 38 34
03 01
05/22/92 16:02:46 to host Status Change link 1
FF 0A 00 19 02 00 00 08 0F 00 37 04 01 08 36 08 00 08 35 30 30 36 38 03 02
05/22/92 16:02:46 to host Progress link 1
FF 0A 00 25 02 80 01 08 08 00 30 08 00 08 35 30 30 36 31 08 00 08 35 30 31 31 35
```


Example: trace link 2

```
05/27/93 12:43:37 from mmlh 2 Trace Link Response
2C 05 19 E9 00 00 00 00 00 00 00 00 00 00 00 00 FF 0A 00 10 01 80 05 02
10 00 1A 03 02 71 03 00
05/27/93 12:44:53 to mmlh link 2 (assoc id=69) Meridian Mail Msg: LH:AM
Register
2C 05 1A 35 2C 05 00 00 00 00 00 00 00 00 00 00 FF 0A 00 1E 45 20 34 07 03 36
2D 14 00 00 75 32 00 00 00 00 63 09 00 00 68 2E 00 00 00 01
05/27/93 12:44:53 from mmlh 2 Meridian Mail Msg: LH:AM Register
F4 7A 3F FF F4 0C 00 00 02 28 00 40 33 70 3F FF FF 0A 00 1E F3 FE 00 07 03 00
2D 14 00 00 75 32 00 01 FF FF 63 09 00 01 00 00 00 00 00 0
```

Link testing commands

Two commands test the physical continuity of links: continuity test and loopback test.

continuity test

This command allows you to test end to end—from the Application Module or IPE Module software to the Meridian 1, including all applications in the module and host computer.

Command format:

```
mlusr> continuity test
```

Example:

```
mlusr> continuity test
```

Continuity test in progress

Results will be printed within 15 seconds

Meridian 1/SL-1 SL16: Link 0 responding

```
mlusr>
```

loopback test

This test verifies the condition of synchronous links, typically link 0 (AML) and link 1 (host link) on the Application Module or IPE Module.

If the Meridian Link system is running with a host link over Ethernet TCP/IP, the user has the option to run a loopback ping test which invokes the UNIX ping command to verify that the host is operational.

This diagnostic test entails connecting a loopback cable between two synchronous ports on the Application Module or IPE Module (typically link 0 and link 1), and running a test from the `mlusr>` prompt to test the ports.

The loopback cable is a 25-pin RS232C, male-to-male straight cable for both the Application Module and the IPE Module.

The loopback test will configure both link 0 and link 1 as HDLC protocol links, and try four different combinations of DTE and DCE settings until the link establishes. If the link does not establish, the test is deemed to have failed, and the reason for the failure will be provided. Refer to Chapter 6, "Link error messages" for descriptions of the error messages.

After the test is completed, the two links are restored to their original configurations.

N One port must be configured as DTE and the other as DCE.
o
t
e
:

Command format:

```
mlusr> loopback test
```

Example:

This command tests links 0 and 1.

```
mlusr> loopback test
```

Enter first Port/Link number (e.g. 0, 1, or 'q'): 0

Enter second Port/Link number (e.g. 0, 1, or 'q'): 1

Please plug in a straight cable between the ports

Ready (yes or no): y

Performing Loopback Test: Link 0 (DTE) and Link 1 (DCE)

Note: 0 and 1 are the port numbers that the user enters.

Configure Link 0 : successful

Configure Link 1 : successful

Enable Link 0 : successful

Enable Link 1 : successful

Loopback Test Successful

Note: If the link is not established, the following messages appears.

Loopback Test failed: reason ...

Restoring original link configuration

Please wait ...

Configure Link 0 : successful

Configure Link 1 : successful

Configure Link 2 : successful

Enable Link 0 : successful

Enable Link 1 : successful

Enable Link 2 : successful

```
mlusr>
```

If TCP/IP is running, the loopback test invokes the UNIX ping command from the mlusr session. You are then prompted to enter the IP address or the host machine name.

N You can use the terminal's interrupt character to escape out of
ping.
t
e
:

Following is a sample session of a loopback test performed on a Meridian Link system using TCP/IP.

Example of a successful ping operation:

This command tests links 0 and 1.

mlusr> **loopback test**

Would you like to ping the host machine or perform the
 loopback test between ports 0 and 1 on the AM?
 Enter p to ping, <cr> to perform loopback (default): **p**

Note: If a failure occurs in checking for TCP/IP, or if the user
 chooses <cr> then the default loopback diagnostic test is
 performed for ports 0 and 1.

Enter the IP address in internet dot notation or host name:

47.72.31.202

Invoking ping command.

PING 47.72.31.202: 56 data bytes

64 bytes from 47.72.31.202: seq=0. time=16. ms

64 bytes from 47.72.31.202: seq=1. time=0. ms

---47.72.31.202 PING Statistics---

2 packets transmitted, 2 packets received, 0% packet loss

round-trip (ms) min/avg/max = 0/8/16

mlusr>

Example of an unsuccessful ping operation:

This command tests links 0 and 1.

mlusr> **loopback test**

Would you like to ping the host machine or perform the
loopback test between ports 0 and 1 on the AM?

Enter p to ping, <cr> to perform loopback (default): **p**

Note: If a failure occurs in checking for TCP/IP, or if the user
chooses <cr> then the default loopback diagnostic test is
performed for ports 0 and 1.

Enter the IP address in internet dot notation or host name:

1.2.3.4

Invoking ping command.

PING 1.2.3.4: 56 data bytes

----1.2.3.4 PING Statistics----

2 packets transmitted, 0 packets received, 100% packet loss

mlusr>

File viewing commands

Two commands are provided for viewing files: view and viewlog.

view

This command enables you to choose a set of log, trace, or record files and to display the set. Trace and record files are described earlier in this chapter, and the SysLog file is described in Chapter 5, “Application Module and IPE Module error messages.”

This command is identical to the view command in maint.

Command format:

```
mlusr> view
```

Example:

```
mlusr> view
```

```
1. Oct_12_93.0001
2. REVERSE: Oct_12_93.0001
3. Oct_13_93.0002
4. REVERSE: Oct_13_93.0002
5. Oct_13_93.0003
6. REVERSE: Oct_13_93.0003
7. Oct_13_93.0004
8. REVERSE: Oct_13_93.0004
```

Make a selection/deselection by entering the desired value:

Type the number corresponding to the file you wish to display and press [Return]. An asterisk (*) will appear beside the entry. You may continue selecting files (they will be displayed as a continuous file, each file with the next appended to it) by typing numbers and pressing [Return].

When you have selected all the files you wish to display at one time, press [Return] again. Your screen displays the contents of the files you selected.

Viewing a file

The following commands are available to you while you are viewing a file:

↑ or u	scroll up through the file, one line at a time
↓ or d	scroll down through the file, one line at a time
Prev or U	scroll up through the file, a screen at a time
Next or D	scroll down through the file, a screen at a time
f	find a particular text pattern When you type f, you are prompted to enter the string to locate. Type in the information and press [Return]. If that pattern exists in the log file, a portion of the log file containing that pattern will appear at the top line of the screen. Note: The f command is case-sensitive. If the system doesn't find the pattern you are looking for, ensure that you entered it correctly (with the proper mix of upper and lowercase characters).

n	find the next occurrence of the same text pattern
x	exit (return to the “maint>” prompt)

viewlog

This command displays the contents of the current SysLog file. This command is identical to the viewlog command in maint.

Command format:

mlusr> **viewlog**

The commands described in the “Viewing a file” section are available to you while you are viewing the SysLog file.

Miscellaneous commands

The miscellaneous commands are exit, quit, help, and version. The exit and quit commands are interchangeable.

exit

This command ends the current mlusr session.

quit

This command ends the current mlusr session.

help

Provides a summary of all available commands, organized by topic. The following symbols are used in the summary:

- # separates the command format from the command description
Example: get links # shows configured links
- | used like the word “or” to separate command variations
Example: display|change linkctl
- [] denotes optional parts of the command format
Example: read|save linkctl [filename]
- { } indicates that you can choose one of the items within the parentheses
Example: get {filter|monitor|record} assoc_id

Figure 11
Link maintenance help command

Meridian Link Administration Command Summary

note: | denotes or, [...] denotes optional, {...} denotes choice

Link configuration and control commands:

```
get links #shows configured links
display|change linkctl #manage link control file
read|save linkctl [file_name] #read/save from/to a different file
display|change link link_number #show/change link parameters
enable|disable|status|statistics link link_number #link operations
read|save link link_number [file_name] #read/save link parameters
```

Association commands:

```
get associations #show current associations
get dn assoc_id #show DNs registered by an association
get resource assoc_id #show resources acquired by an association
get {filter|monitor|record} assoc_id #show status
set|clear {filter|monitor|record} assoc_id {msg_name|msg_type}
enable|disable {filter|monitor|record|msgstat} assoc_id
get msgstat assoc_id {msg_name|msg_type} #show message stats status
clear msgstat assoc_id #clear message stats
enable|disable|display load assoc_id #manage traffic monitor
enable traffic assoc_id {period} {file_name} {lpr} {terminal}
disable traffic assoc_id
```

Test commands:

```
continuity test # show diagnostic tests results
loopback test # show diagnostic loopback results
```

Trace commands:

```
trace link link_number [trace_level] [file_name] #trace link traffic
trace main trace_level [file_name] #trace through traffic
untrace link link_number or untrace main #set trace off
```

Commands for more help/information:

```
help, ?, help messages, help command #list this and other help pages
version, ver #show MeridianLink release running
view #display system log, trace or record files
viewlog #display system log
```

Quitting or exiting mlusr session:

```
quit, exit #quit this login and return to maint/login:
```

```
link_number = 0 (internal link) or 1 (host link) or 2 (Meridian Mail link)
assoc_id    = 1, 2, 3 etc. (use get associations to determine)
trace_level = 0 (full) 1 (partial - no polls)
file_name   = Unix file name
terminal    = Key word for outputting report to terminal
lpr         = Key word for outputting report to printer
```

Figure 11
Link maintenance help command (continued)

Examples:

```
mlusr> status link 1      mlusr> g a (get associations)
mlusr> set monitor 2 all  mlusr> enable monitor 2
mlusr> display link 1     mlusr> change link 1
mlusr> trace link 1       mlusr> disable link 1
mlusr> get traffic 1      mlusr> enable traffic 1 5 terminal lpr file 1
mlusr> disable traffic 1  mlusr> enable traffic 1
mlusr> loopback test      mlusr> continuity test
```

Last change: 2/19/93

help command By entering part of a command (usually a key word in the command format), detailed help is displayed if it is available.

help msgtypes Provides a summary list of all Meridian Link messages (message type and message name) that are passed across the link between the Application Module or IPE Module and the host.

help messages Provides a summary of Meridian Link message names used up to Meridian Link Release 5.

Help information is usually too long to display on the screen at one time, so you are prompted to press [Return] key to continue viewing help.

version

This command indicates the current software release of any applications running on the Application Module or IPE Module.

Example: (CCR and Meridian Link installed)

mlusr> **version**

The following packages are installed on this Application Module:

Product: SYSTEM V/68 Base Operating System R3V7
Version: FE03.71 RM03
Installed: May 1 10:57

Product: Customer Controlled Routing
Version: 03.53
Installed: May 1 14:30

Product: SYSTEM V/68 Base Operating System R3V7 Field Update
Version: FU_R3V7.1_NT-D
Installed: Mat 1 10:52

Product: Meridian Applications
Version: R05.20
Installed: May 1 14:40

Product: Meridian Link & X25NET333
Version: 05.00
Installed: May 1 14:30

Type return to continue, q to quit: <cr>

— continued —

Example: (CCR and Meridian Link installed) (continued)

Product: Host Based X.25 for NTI
Version: ECK01.0 IR03
Installed: May 1 12:25

Product: X25NET333 DNLD, DRIVER/API,NETMAN
Version: Release 4.1
Installed: May 1 12:21

Product: LP Support System
Version: LQ02.03
Installed: May 1 10:52

Product: SYS V/68 Network Services Extension R3V7.1
Version: NS03.71 RM02
Installed: May 1 14:39

Product: On-line Manual Pages Object Package (OLMP)
Version: OM03.71
Installed: May 1 10:57

Product: Standalone System Interactive Diagnostics (SSID)
Version: DJ07.30
Installed: May 1 10:52

mlusr>